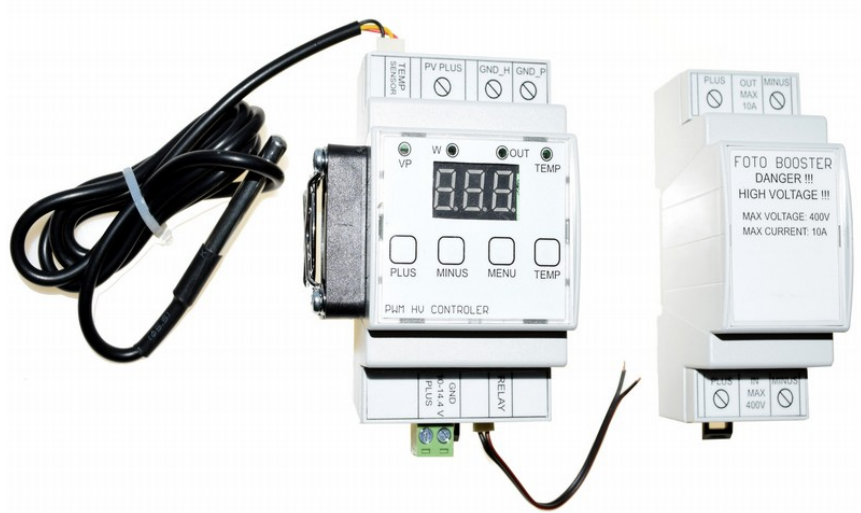


USER MANUAL

PWM REGULATOR HEATER FIRED WITH SOLAR PANELS.

Actii AC7391



1. NOTES ON SAFETY

- Before commissioning read this manual.
- All connections and changes must be made while the power supply and the voltage of the panels.
- It is necessary to ensure proper working conditions, in accordance with the specifications of devices, such as supply voltage, temperature, maximum current consumption.
- Installation and setting up devices need to have appropriate skills, so they can only be performed by qualified personnel, after reading the whole manual.
- Incorrectly connected equipment may be damaged.
- Responsibility for proper installation responsibility of the person assembling. Make sure you have met all guidelines and standards in the country.
- Electrostatic discharge can damage the unit. Use proper protection.
- It should protect the system against lightning by removing the controller from the panel during a storm.
- Any unauthorized alteration, modification and repair attempts will void the warranty.
- The regulator must be disconnected from the panels leave the apartment for more than one day !!!

2. DESCRIPTION AND PRODUCT PROPERTIES

Heater controller is used to control the load panels by changing the filling factor of the PWM, and the combined buffer charge as the active load, which enables the panels at the point of MPPT, the highest power factor. For proper operation and yields the greatest power to provide an adequate load for the controller. The regulator should be charged with a heater adapted to strong nominal power panels, and a voltage corresponding to the voltage MPPT panels. Generally, the idea is that the regulator was an element of reducing the load of panels in case of no sufficient sunlight, and thus allowed the maintenance of the panels at the optimum operating point. The controller itself is nothing but a very fast relay SSR, which should be equipped with a module with capacitors, so that the panels will be properly loaded. Without the buffer charge controller works as a normal thermostat, which charged up at the moment of inclusion or completely relieves the time off. The presence of the cache increases system performance by approx. 30%. The controller also acts as a thermostat preventing overheating of the boiler. Controller for its correct operation requires a stabilized power supply voltage specified in the parameters of the device. The controller has a number of safety features such as active cooling (incorporated in the case at 37 degrees or above power 1900W) excluding below a temperature drop of 35 degrees or below 1500W power. This solution provided a comfortable environment for operating the actuators (transistors) providing sufficiently high security. In case no sufficient cooling (e.g. in the case of staining the heat sink, fan failure) was used as an additional security emergency shutdown at a temperature of 60 degrees, which is to protect the output stage from being damaged by heat. The device also monitors the supply voltage, and when it is too low (not enough to make the transistors in saturation mode) activates the function disable transistors. This prevents conduction in the active mode, and thus exposed to excessive amounts of heat separation, which could damage the actuators. The device is equipped with an additional relay output (potential-free) to enable external notification devices that heat water has been completed (achieving the set temperature) or entry into Safe Mode (failure actuator) ER.1. As an additional security elements applied with a SSR DC, which makes it possible emergency stop heating the water in the event of an actuator. This solution gives almost full security assurance solar power.

3. ACCOMMODATIONS AND CONNECTION

The device to work properly requires a proper connection. The target location to mount the box is equipped with surface-mounted rails TH35 and additional ventilation holes. The lack of holes can lead to too frequent entering control mode emergency shut down due to excessive heat.

WARNING!!!

The presence of buffer loads is not necessary for operation, however, significantly increases the efficiency of the system providing the maximum energy output of panels.

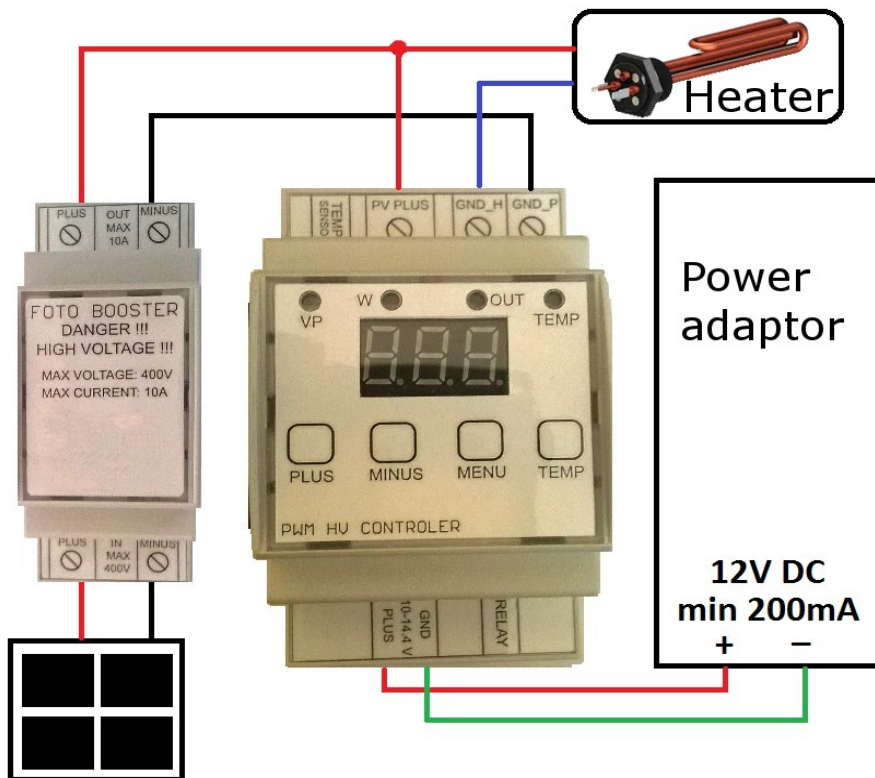
WARNING!!!

Buffer charge the capacitor battery can be replaced, but the solution will be quite safe and aesthetic.

The recommended connection arrangement control is given below. It does not present the possibility of using additional output RELAY serving example.

Disconnecting the panels (by SSR DC) in the event of failure of the controller.

The regulator should be connected as shown below.



4.KONFIGURACJA

Configuration is to set the minimum operating voltage (required for proper operation of the battery charge controller (if any)) operating mode and the temperature set point of the boiler.

Changing the operating mode:

This is done by holding the MENU button until you change the subtitle display. There are two modes:

Mode One:

It is fully automatic and starts to work immediately after connecting. When the voltage at the input exceeds the minimum voltage threshold settable by pressing MINUS. If the tuning voltage falls below this value, the search is interrupted. Setting the minimum value gives you free water and heating at the same time the possibility of charging.

The second mode:

The ability to set threshold voltage switching (from which begin to increase the value of the PWM) and the maximum voltage (from which the duty ratio is 100%), ie all the energy cells goes directly to the heater.

Additionally, this method allows to maintain the panels at a point MPPT (greatest point of force), and is particularly suited for wind turbines. In this case it prevents excessive ramping of turbines as well as it allows free start.

Setting the minimum operating voltage (only mode I) is done by holding the MINUS (when I set the operation mode) to change the state of the display. Then we adjust the minimum operating voltage, which is stored after a few seconds of inactivity.

Setting the set temperature of the boiler is carried out analogously, or by holding the TEMP to the change of the display. Then we can set the desired temperature with an accuracy of 1 st. After a few seconds of inactivity the device saves the setting and switches to normal operating mode.

WARNING!!!

Changed settings are stored in non-volatile memory and are still active after a reboot.

During normal operation, the display shows the following parameters, the LED lights PV is the current voltage is displayed on the panels, the LED lights in the display shows the current power delivered to the heater. When the light is flashing OUT it indicates that the heater is in the active control. Steady suggests that the heater is fully actuated (filling 100%). No light suggests the heater off. TEMP suggests diode display of the actual temperature of the boiler nearest 0,1stopnia.

PRZYWRACNIE FACTORY DEFAULT SETTINGS

To restore factory settings, hold the MENU button when you turn the device. Using this function will be deleted all user settings.

5. TECHNICAL DATA

power supply	11 V to 14.4 V
connection panel	From 10V to 400V DC
current panels	to 10A
Maximum power heater	2kW
Maximum power panels	2kW
The current drawn from the power supply without cooling	0.08 A
The current drawn from the power supply	0.23
The accuracy of temperature	0.1 degree

6. INFORMATION SERVICE

WARNING!!!

Inscription ER.0 Indicates an emergency shutdown of the driver due to low supply voltage, which could lead to damage to the heater control transistor.

WARNING!!!

ER.1 means damage control transistor, immediately disconnect the controller and return to the site. At the time of display of this error is still powered heater panels and the controller is not able to turn it off!

Leaving the regulator of this error can lead to melting, and even fire.

The CE symbol on the device means the device's conformity with EMC Directive 2004/108 / EC (Electromagnetic Compatibility Directive).

This sign on the machine is forbidden to place the used equipment together with other waste. Equipment must be delivered to the designated points of dealing with disposal. (According to the Act on waste electronic equipment dated 29 July 2005)